

March 18, 2005

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop P1-137  
Washington, DC 20555-0001

ULNRC05134



Ladies and Gentlemen:

**DOCKET NUMBER 50-483  
CALLAWAY PLANT UNIT 1  
UNION ELECTRIC CO.  
FACILITY OPERATING LICENSE NPF-30  
LICENSEE EVENT REPORT 2005-001-00  
Reactor trip while replacing RP043 Control Cabinet Power Supply**

The enclosed licensee event report is submitted in accordance with 10CFR50.73(a)(2)(iv)(A) to report a reactor trip that occurred while replacing a power supply within Control Cabinet RP043.

This letter does not contain new commitments.

Sincerely,

A handwritten signature in black ink, appearing to read "S Sandbothe".

Louis S. Sandbothe  
Superintendent,  
Design Engineering

LSS:EWB:slk  
Enclosure

IE22

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U.S. Nuclear Regulatory Commission  
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## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [Infocollects@nrc.gov](mailto:Infocollects@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Callaway Plant Unit 1	2. DOCKET NUMBER 05000 483	3. PAGE 1 OF 5
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4. TITLE  
Reactor trip while replacing RP043 Control Cabinet Power Supply

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
1	19	2005	2005	- 001 -	00	3	18	2005	FACILITY NAME	DOCKET NUMBER

9. OPERATING MODE 1	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)									
10. POWER LEVEL 100	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)						
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)						
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)						
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)						
	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)						
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)						
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)						
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER						
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A							

## 12. LICENSEE CONTACT FOR THIS LER

FACILITY NAME M. A. Reidmeyer, Regional Regulatory Affairs Supervisor	TELEPHONE NUMBER (include Area Code) (573) 676-4306
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## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	JG	JX		Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

## 15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 1251, 1/19/05, a reactor trip occurred while replacing the primary power supply in Control Cabinet RP043. During replacement of the failed power supply, pressure was applied to the top of the secondary power supply located beneath the failed power supply. The top cover of the secondary power supply flexed inward and shorted out an energized heat sink that caused a momentary failure of that power supply. This resulted in "A" Main Feedwater Regulating Valve going closed and causing a reactor trip on Low-Low level in "A" Steam Generator (S/G). The plant was stabilized in Mode 3 and both the primary and secondary RP043 power supplies were replaced. Callaway Plant returned to power at 1735 on 1/20/05.

A Root Cause Analysis was conducted and concluded that the impact of not placing pressure on top of a power supply was not clearly understood, work instructions did not adequately address power supply removal techniques, and appropriate tools were not available. Corrective actions include additional training, procurement or fabrication of necessary tools, and development of improved work instructions for future power supply replacements.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

**I. DESCRIPTION OF THE REPORTABLE EVENT**

**A. REPORTABLE EVENT CLASSIFICATION**

This event is reportable under 10CFR50.73(a)(2)(iv)(A) as an actuation of the Reactor Protection System and Auxiliary Feedwater System.

**B. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT**

Callaway Plant was in Mode 1 operating at 100 percent power.

**C. STATUS OF STRUCTURES, SYSTEMS OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND THAT CONTRIBUTED TO THE EVENT**

The primary Power Supply (P/S) [Manufacturer: ITT North, Model: PEC3569] for 7300 Control Cabinet RP043 had failed at 1227, 1/18/05. A decision had been made to replace the failed P/S while on-line and the work was scheduled for the following AM shift on 1/19/05.

**D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES**

At 1227, 1/18/05, an annunciator was received in the Callaway Control Room indicating a P/S had failed in one of the control cabinets. Investigation determined that the alarm was due to failure of the primary P/S in 7300 Control Cabinet RP043. After discussing the situation, the Shift Supervisor and Emergency Duty Officer decided to perform emergent on-line maintenance and replace the failed P/S supply on the following AM shift.

Using instructions from previous similar P/S replacements, a work package was created for replacement of the failed RP043 primary P/S. On the morning of 1/19/05, two formal pre-job briefs were conducted, one with the Instrument and Control (I&C) personnel performing the replacement, and a second involving the I&C personnel and Control Room staff. During the first I&C brief, OE16445 was discussed involving the use of a separation plate (commonly referred to as a skid plate) between the primary and secondary P/S. In the second brief with I&C and Control Room staff, major steps of the evolution were discussed as well as contingencies for the complete loss of the secondary power supply plus the need to manually trip the reactor should a loss occur.

When work commenced on the primary P/S replacement, it was determined that the work instructions did not identify that an air gap of approximately two inches existed between the upper primary P/S and the lower secondary P/S. At this point, work was stopped based upon concerns that the primary P/S should not be dropped onto the secondary P/S. It was identified that the space was approximately the same dimensions as a "screw catcher" device normally used for Foreign Material Exclusion (FME) purposes. Without revising the work instructions, it was decided to insert the screw catcher and skid plate in the air gap to support lowering the primary P/S while it was being removed. The screw catcher was placed onto the secondary P/S and the skid plate was placed on top of the screw catcher device. As the primary P/S was being removed and lowered onto the skid plate and screw catcher device, the screw catcher device exerted pressure on the secondary P/S top vented cover causing the cover to distort inward and momentarily short an energized heat sink within the secondary power supply. This caused a momentary power interruption from the secondary P/S [Manufacturer: North Electric Company, Model: PEC3569] and thus cabinet RP043. The momentary power interruption caused "A" Main Feedwater Regulating Valve to close, both Main Feedwater Pump speed controllers to decrease to minimum output, and the following control functions to revert to manual:

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- AEFCV0550 (S/G A MAIN FEEDWATER REGULATING VALVE BYPASS VALVE)
- PRESSURIZER PRESSURE AND LEVEL CONTROL
- BBPCV0455B (REACTOR COOLANT PUMP A DISCH PRESSURIZER SPRAY LINE ISO PCV)
- BBPCV0455C (REACTOR COOLANT PUMP B DISCH PRESSURIZER SPRAY LINE ISO PCV)

Since the power interruption was only momentary, not all of the expected annunciators from the earlier pre-job brief were received. After observing the annunciators that were received and attempting to regain control of the "A" Main Feedwater Regulating Valve, the Control Room staff recognized that a manual trip was necessary. However, before a manual trip could be initiated, the reduction in feedwater flow to the "A" Steam Generator (S/G) resulted in an automatic Low-Low Level reactor trip at 1251, 1/19/05.

All plant systems responded as required. The plant was stabilized in Mode 3 at normal operating pressure and temperature. After the cause of the reactor trip was determined, it was decided to complete the replacement of both RP043 primary and secondary P/S. At 1735, 1/20/05, Callaway Plant was returned to power. Subsequent troubleshooting of the failed primary P/S determined that the fault was due to an internal failure within the T1 transformer.

The reactor trip was documented in NRC Event Notification #41347.

**E. METHOD OF DISCOVERY OF EACH COMPONENT, SYSTEM FAILURE, OR PROCEDURAL ERROR**

The failure of the RP043 primary P/S was identified after receiving a power supply failure alarm on the Main Control Board annunciator panels.

The momentary failure of the RP043 secondary P/S was identified by combination of both plant annunciator actuations and multiple equipment controls reverting to manual or low speed settings.

**II. EVENT DRIVEN INFORMATION**

**A. SAFETY SYSTEMS THAT RESPONDED**

The Reactor Protection System (RPS) actuated and caused a reactor trip after level in the "A" S/G decreased to the Low-Low Level Reactor Trip setpoint.

The Auxiliary Feedwater System actuated upon the reactor trip and low S/G water levels.

**B. DURATION OF SAFETY SYSTEM INOPERABILITY**

No Safety Systems were Inoperable as a result of this event.

**C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT.**

This event was evaluated and determined to be of very low risk significance.

**III. CAUSE(S) OF THE EVENT AND CORRECTIVE ACTION(S)**

A Root Cause Analysis team was assembled to review the event in order to determine the cause(s) of this event and Corrective Action to Prevent Recurrence (CATPR). The team concluded that there was one Causal Factor (CF) and three Root Causes (RC).

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1. CF-1: Maintenance I&C Technicians used improper tooling, a "screw catcher" device, to facilitate removal of a Westinghouse 7300 Process Control cabinet power supply.

The Root Causes are identified as RC and the corrective action(s) for each RC are listed as CATPR.

1. RC-1: The intent of Industry Operating Experience 16445 was not completely recognized in regard to protecting the secondary power supply from an internal short. When the I&C Department devised a method, which deviated from the written work instruction, to address the removal of the Westinghouse 7300 Process Control cabinet primary power supply, the importance of not placing pressure on the secondary power supply top vented cover was not fully recognized. As a result, pressure was placed on the top vented cover, causing the top vented cover to momentarily short to the energized heat sink within the secondary power supply. This led to the momentary interruption of the secondary power supply output voltage.

CATPR-1a: Train Maintenance I&C personnel on the operating experience from this event including the Westinghouse 7300 power supply components. Address the internal layout of components, the lack of rigidity of the power supply cover, short potentials that exist within the supply, troubleshooting techniques for the determination of failed components, determination of power supply status with failed indications, and industry operating experience.

CATPR-1b: Communicate to all personnel the use of human performance tools as described in LDP-ZZ-01410, Tools for Event Prevention, as related to this event. Emphasize how the proper use of human performance tools should have prevented this event, specifically Peer Checking, Stop When Unsure, Procedure Use and Compliance, Job Preparation and Task Assignment, and Pre-Jobs Briefs.

CATPR-1c: Set a standard for site fabricated tooling. The standard will define the required evaluations and instructions for use. Deviations to tool work instructions or modifications to tools must be re-evaluated. Communicate standard and expectations to all personnel.

2. RC-2: The work instructions specified improper removal method for a Westinghouse 7300 Process Control cabinet primary power supply. Instead, the work instructions were written for a Westinghouse 7300 Process Protection cabinet. The difference between the Control and Protection cabinets is the space between the primary and secondary power supplies.

CATPR-2: Develop detailed work instructions (procedure based work instructions) for the removal and reinstallation for all Westinghouse 7300 Process Control and Protection power supplies. Evaluate these tasks against IPTE criteria described in APA-ZZ-0100A, Infrequently Performed Test or Evolution Guidance.

3. RC-3: The proper tooling was not available to the Maintenance I&C Department for the removal and re-installation of the Westinghouse 7300 Process Control cabinet primary power supply.

CATPR-3a: Obtain or develop proper tooling for removal and re-installation of Westinghouse 7300 Process Control and Protection power supplies.

CATPR-3b: Train Maintenance I&C personnel on the proper use of tooling for removal and re-installation of Westinghouse 7300 Process Control and Protection power supplies.

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**IV. PREVIOUS SIMILAR EVENTS**

The 1/18/05 failure of the 7300 Control Cabinet primary P/S was documented in Callaway Action Request (CAR) 200500322 and the ensuing reactor trip while replacing the failed P/S was documented in CAR 200500354.

A review of the Callaway Action Request System (CARS) was conducted to determine if any similar failures had occurred within the past three years. The search encompassed the time frame from 1/1/02 until the reactor trip on 1/19/05. Only one prior occurrence of a similar failure was identified. This failure is documented in CAR 200208057 and documents failure of the primary P/S in Protection Cabinet SB042. On this occurrence, the failed primary P/S was successfully replaced while at power and without any consequences.

A review of LERs from 2002 until present did not reveal any similar events.

**V. ADDITIONAL INFORMATION**

The system and component codes listed below are from the IEEE Standard 805-1984 and IEEE Standard 803A-1984 respectively.

System: JG

Component: JX